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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/931,585	08/15/2001	Stephen D. O'Connor	266/263	2200

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EXAMINER

WOOD, KEVIN S

ART UNIT PAPER NUMBER

2874

DATE MAILED: 04/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/931,585

Applicant(s)

O'CONNOR ET AL.

Examiner

Kevin S Wood

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6, 10-19, 21-23, 25, 28, 29, 31-35 and 37-41 is/are rejected.
- 7) ☒ Claim(s) 5, 7-9, 20, 24, 26, 27, 30 and 36 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 August 2001 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: Brian Healy

## DETAILED ACTION

### *Drawings*

1. The drawings are objected to because of numerous typographical errors. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 15, 16, 17, 110, 111, 112, 113, 120, 121, 131, 132, 134, 135, 142, 143, 145, 146, 151, 151A, 152, 153, 155, 156, 157, 161, 162, 163, 164, 168, 169, 190, 208, 209, 210, 230, 231, 233, 234, 239, 242, 250, 251, 253, 256,.... There are too many to list. It appears that almost every drawing has reference numbers that are missing the last digit.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

3. The drawings are objected to because they do not include the following figure number(s) mentioned in the description: Fig. 1A, Fig 1B, Fig. 2A, Fig. 2B, Fig. 3B, Fig. 5A, Fig. 5B, Fig. 5C, Fig. 5D, Fig. 7A, Fig. 7B.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 6 recites the limitation "the manipulation step" in the first line. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-4, 6, 11-19, 29, 31-35 and 37 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,154,586 to MacDonald et al.

Referring to claim 1, MacDonald et al. discloses all the limitations of the claimed invention. MacDonald et al. discloses an optical switch mechanism used within an optical network that includes: a light source (16); a light receiver (24); a device (10) for altering, by light-fluid interaction, a light beam (36) the device having a transmissive

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portion and containing a plurality of fluids behind the transmissive portion, the transmissive portion being disposed in an optical path between the light source and the light receiver to permit light-fluid interaction; and means (34) for repeatedly manipulating the proportion of at least one of the plurality of fluids optically disposed between the light source and light receiver, wherein the manipulation affects reflection, of the light beam by at least one of the plurality of fluids. See Fig. 1a and Fig. 1b, along with their respective portions of the specification.

Referring to claim 2, MacDonald et al. discloses all the limitations of the claimed invention. MacDonald et al. discloses that the manipulation means (34) may be a pump, capable of varying the flow rate of the fluid.

Referring to claim 3, MacDonald et al. discloses all the limitations of the claimed invention. MacDonald et al. discloses that the first and second fluids are arranged in overlapping layers. See Fig. 1 and Fig. 2.

Referring to claim 4, MacDonald et al. discloses all the limitations of the claimed invention. MacDonald et al. discloses that the thickness of light reflective fluid in cavity (28) may be reduced to allow light to be transmitted to the light transmissive fluid in cavity (31). See Fig. 1b.

Referring to claim 6, MacDonald et al. discloses all the limitations of the claimed invention. MacDonald et al. discloses the manipulation of the portion of the transmissive fluid in cavity (31) enables light emitted from the light source (16) to be received by the light receiver (24). See Fig. 1b.

Referring to claim 11, MacDonald et al. discloses all the limitations of the claimed invention. MacDonald et al. discloses that the device is automated. The switching is controlled by an electrical input. See col. 7, lines 3-23.

Referring to claim 12, MacDonald et al. discloses all the limitations of the claimed invention. MacDonald et al. discloses that the input port (16) includes a graded index (GRIN) lens. This lens would be capable of collimating the input light beam (36) from the light source (14). See column 5, lines 43-45.

Referring to claim 13, MacDonald et al. discloses all the limitations of the claimed invention. MacDonald et al. discloses that the flexible member may be opaque, therefore it is inherent that the device would filter some of the light. See Fig. 5a and 5b, along with their respective portions of the specification.

Referring to claim 14, MacDonald et al. discloses all the limitations of the claimed invention. MacDonald et al. discloses that the device is an optical switch.

Referring to claim 15, MacDonald et al. discloses all the limitations of the claimed invention. MacDonald et al. discloses a optical switch, including: an input light source (16); an input coupler (14); an output coupler (22); a device for manipulating light (10), the device being optical coupled between the input coupler and the output coupler; and an output device (24) fore receiving a beam from the output coupler. See Fig. 1a and Fig. 1b, along with their respective portions of the specification.

Referring to claim 16 and 17, MacDonald et al. discloses all the limitations of the claimed invention. MacDonald et al. discloses that the input port (16) and the output

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port (22), include optical elements in the form of graded index (GRIN) lenses. See column 5, lines 43-45.

Referring to claim 18, MacDonald et al. discloses all the limitations of the claimed invention. MacDonald et al. discloses that the system is integrated into a single optical apparatus (10). See the figures.

Referring to claim 19, MacDonald et al. discloses all the limitations of the claimed invention. MacDonald et al. discloses that the device is controlled by voltage inputs. It is inherent that the device would include a power supply and a means for controlling the power supply. See col. 7, lines 3-23.

Referring to claim 29, MacDonald et al. discloses all the limitations of the claimed invention. MacDonald et al. discloses an optical switch mechanism used within an optical network that utilizes a method of switching including the steps: providing a light source (16) and a light receiver (24); providing an enclosed channel (28) containing a fluid; providing a deformable member (26) in fluid communication with the channel and deforming the deformable member to displace at least a portion of the fluid contained in the channel to selectively enable light to be transmitted through the switch. See Fig. 1a and 1b, along with their respective portions of the specification.

Referring to claim 31, MacDonald et al. discloses all the limitations of the claimed invention. MacDonald et al. discloses that the fluid is substantially reflective of at least a portion of the light, and the deformable member is substantially absorptive of at least a portion of the light from the light source. See Fig. 1a and 1b, along with their respective portions of the specification.

Referring to claim 32, MacDonald et al. discloses all the limitations of the claimed invention. MacDonald et al. discloses that the deformable member is pneumatically actuated. See col. 5, lines 60-62.

Referring to claim 33, MacDonald et al. discloses all the limitations of the claimed invention. MacDonald et al. discloses an optical switching device utilizing the method. See Fig. 1a and Fig. 1b.

Referring to claim 34, MacDonald et al. discloses all the limitations of the claimed invention. MacDonald et al. discloses an optical switch mechanism used within an optical network that utilizes a method of switching including the steps: providing an enclosed device (10) having a chamber (31) bounded by a deformable flexible membrane, the chamber containing fluid; supplying a light beam (36) to the device in the direction of the flexible membrane; manipulating the pressure within the chamber, thereby deforming the flexible membrane (26) and changing the amount of fluid present in the chamber. See Fig. 1a and 1b, along with their respective portions of the specification.

Referring to claim 35, MacDonald et al. discloses all the limitations of the claimed invention. MacDonald et al. discloses that the flexible membrane (26) is transmissive and that the light beam interacts with fluid contained in the chamber. See Fig. 1b.

Referring to claim 37, MacDonald et al. discloses all the limitations of the claimed invention. MacDonald et al. discloses an optical switch mechanism used within an optical network that includes: a light source (16); a chamber (31) containing a fluid, and bounded by a deformable flexible membrane (26); supplying a light beam (36) to the



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device to be received by the flexible membrane; and manipulating the pressure within the chamber, thereby deforming the flexible membrane and changing the amount of fluid present in the chamber. See Fig. 1a and 1b, along with their respective portions of the specification.

8. Claims 22, 23, 25 and 28 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,360,775 to Barth et al.

Referring to claim 22, Barth et al. discloses all the limitations of the claimed method. Barth et al discloses a method of optical switching including: providing a first light source (340) and a first light receiver (346); providing an enclosed channel ( ) containing a first fluid (402) and a second fluid, the fluids being substantially immiscible and defining a discrete plug of the first fluid; and manipulating the first fluid plug to selectively enable light emitted from the first light source to be received by the first light receiver.

Referring to claim 23, Barth et al. discloses all the limitations of the claimed method. Barth et al discloses an actuator (316) used to manipulate the first liquid.

Referring to claim 25, Barth et al. discloses all the limitations of the claimed method. Barth et al discloses the first liquid is manipulated by inducing a pressure gradient within the channel.

Referring to claim 28, Barth et al. discloses all the limitations of the claimed method. Barth et al discloses the step of manipulating the first fluid to selectively enable light emitted from the first light source to be received by a second light receiver (342).

9. Claims 38, 39 and 41 rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,445,845 to Sakata et al.

Referring to claim 38, 39 and 41, Sakata et al. discloses all the limitations of the claimed invention. Sakata et al. discloses a method of optical switching, including: providing a first fluidic device disposed in a first device layer; providing a second fluidic device disposed in a second layer; supplying a light beam to the first fluidic device; and manipulating the first device to selectively transmit at least a portion of the light beam to the second fluidic device. In Fig. 1, Sakata discloses a fluidic switch. In Fig. 4, Sakata discloses that the devices can be arranged in layers, where the devices can be controlled to direct light to any switch or output desired.

***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

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under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 10 and 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,154,586 to MacDonald et al.

Referring to claim 10, MacDonald et al. discloses all the limitations of the claimed invention, except MacDonald et al. doesn't appear to specifically disclose that one of the fluids contains dissolved or suspended particles. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a fluid with suspended particles or any other suitable fluid, since it has been held to be within the general skill of a worker in the art to select a known material on basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Referring to claim 21, MacDonald et al. discloses all the limitations of the claimed invention, except MacDonald et al. does not appear to specifically disclose that the input source provides a monochromatic beam. It would have been an obvious matter of design choice to have the input source provide an monochromatic light beam, since the applicant has not disclose that the use of a monochromatic beam solves any stated problem or is for any particular purpose and it appears the invention would perform well if a monochromatic beam were used.

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13. Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,445,845 to Sakata et al.

Referring to claim 40, Sakata et al. discloses all the limitations of the claimed invention, except Sakata et al. does not appear to specifically disclose that the second device layer is a curvilinear surface. It would have been an obvious matter of design choice to have the second device layer any suitable shape, since the applicant has not disclose that the curvilinear shape solves any stated problem or is for any particular purpose and it appears the invention would perform well if a monochromatic beam were used.

***Allowable Subject Matter***

14. Claims 5, 7-9, 20, 24, 26, 27, 30, and 36 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

15. The following is a statement of reasons for the indication of allowable subject matter:

Referring to claim 5, the prior art does not disclose a mixer for substantially mixing at least two of the plurality of fluids, wherein the light beam interacts with the resulting mixture.

Referring to claims 7-9, the prior art does not disclose the fluids being immiscible, where the first fluid defines a plug, and the manipulation means includes a deformable flexible member in fluid communication with the first fluid plug.

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Referring to claim 20, the prior art does not disclose a sensor, wherein the controller receives a feedback signal from the sensor.

Referring to claims 24, 26, and 27, the prior art does not disclose that the manipulation of the first fluid plug is performed by deforming a flexible member in fluid communication with the microfluidic channel.

Referring to claim 30, the prior art does not disclose that the fluid is substantially absorptive of at least a portion of the spectrum emitted by the light source and that the deformable member is substantially reflective of at least a portion of the spectrum emitted from the light source.

Referring to claim 36, the prior art does not disclose that the deformable member is substantially reflective of the emitted from the light source.

### ***Conclusion***

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 6,487,333 to Fouquet et al.

U.S. Patent No. 6,470,106 to McClelland et al.

Each of these references discloses a device and method of optical switching similar to that of the claimed invention.

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17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin S Wood whose telephone number is (703) 605-5296. The examiner can normally be reached on Monday-Thursday (7am - 5:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney B Bovernick can be reached on (703) 308-4819. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 307-0956.

KSW  
April 1, 2003

A handwritten signature in black ink, appearing to read "Brian Healy". The signature is fluid and cursive, with a large initial "B" and a stylized "H".

Brian Healy  
Primary Examiner